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Maine Agricultural Experiment Station

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FEBRUARY, 1904.

POULTRY MANAGEMENT.

This bulletin contains an account of the methods of poultry management in use at this Station, including methods of incubation, treatment and housing of young chicks, a description of the warmed and curtained front houses, the trap nests, and methods of feeding laying hens.

Requests for the Bulletins should be addressed to the
AGRICULTURAL EXPERIMENT STATION,
Orono, Maine.

MAINE

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Warmed House.

Curtain Front House.

FIG. 1. POULTRY HOUSES DESCRIBED ON PAGES 11-16.

POULTRY MANAGEMENT AT THE MAINE AGRICULTURAL EXPERIMENT STATION.

G. M. GOWELL.

Many years practical experience in raising and keeping poultry and investigations in poultry breeding at this Station have resulted in the accumulation of a considerable fund of information on poultry management. The object of this paper is to outline this experience for the benefit of poultry keepers, and help them discriminate between some of the wrong theories which have underlain much of the common practice of the past, and the better theories, which underlie other and newer methods that are yielding more satisfactory results. It may be that the methods in vogue with us are no better than those practiced by others, but in the following pages the attempt is made to concisely state the practices which are now being successfully employed at this Station.

The difficulties attending artificial poultry keeping lie in the numbers of small animals that make up the business. With most domestic animals the care-taker treats each one individually, and there is far less draft on the abilities of the herdsman with his large animals than on the manager of even a small poultry plant with its far greater numbers of individuals.

Labor is the costliest factor that enters into the management and equipment of a poultry farm. The cost of food required to produce a pound of beef, pork or chicken does not differ greatly, but while the dressed steer and pig sell for from 5 to 8 cents per pound, the chicken sells for from 15 to 20 cents per pound, and early in the season for much more. The differences in their selling prices represent the differences in the risk and the skill employed in their production. Furthermore, the increasing demand for choice articles of food will tend to maintain these prices, even though the supply be greatly increased. The products of the poultry farms, the fresh self-sealed eggs, each an

unbroken package in itself, and the delicately flavored chickens, are among the choicest articles of food to be found in the markets.

While poultry raising is exacting in its demands, there are no conditions imposed that cannot be compassed by persons of ordinary mental and physical capacity. In this as in other callings, the skill which comes from thorough training and the energy needed for persistent work are essential to the fullest success.

The history of the poultry industry of this country is being rapidly made, these years, on the farms, village lots, and at the experiment stations, and written in the minds of the thousands of earnest workers who are engaged in it. From this accumulated knowledge is to come, in the near future, a better, general understanding of the subject, which will enable men or women of ordinary abilities to take up the work for themselves, in a small way, and proceed without making many of the mistakes that caused their predecessors to waste money and labor, and lose heart. Poultry and egg production are as legitimate lines of work for persons of small or large means as are dairying, beef growing, sheep husbandry, or general or special crop production. Its advantages lie in its greater returns for its smaller capital investment. Its disadvantages lie in the demand for greater skill, patience and courage than will suffice for any other special, or general farm industry.

RAISING CHICKENS BY NATURAL PROCESSES.

Circumstances sometimes make it necessary to hatch and raise chickens by aid of the mother hen. While we do not like the method, we have practiced it; having at times as many as a hundred sitting hens along the side of a room—in two tiers—one above the other. An unused tieup in a barn was taken for the incubating room and a platform was made along the side next to the barn floor. The platform was 3 feet above the floor and was two and a half feet wide and 50 feet long. It was divided up into 50 little stalls or nests, each one foot wide and 2 feet long, and one foot high. This left a 6 inch walk along in front of the nests, for the hens to light on when flying up from the floor. Each nest had a door made of laths at the front, so as to

give ventilation. It was hinged at the bottom and turned outward. Across the center of each nest, a low partition was placed, so that the nesting material would be kept in the back end, the nest proper. For early spring work paper was put in the bottom of the nest, then an inch or two of dry earth, and on that the nest, made of soft hay.

Whenever half a dozen hens became broody they were taken in from the hen house and put on the nests, each nest having a dummy egg in it; the covers were then shut up and nearly every hen seemed contented. In a day or two thirteen eggs were placed under each bird. Every morning the hens were liberated as soon as it was light, when they would come down of their own accord and burrow in the dry dust on the floor, eat, drink, and exercise, and in twelve or fifteen minutes, they would nearly all go onto the nests voluntarily. In the afternoons one would occasionally be found off the eggs, looking out through the slatted door. If she persisted in coming off she was exchanged for a better sitter. The double nest is necessary, otherwise the discontented hen would have no room to stand up, except on her nest full of eggs, and she would very likely ruin them. With the double nest there was no danger of this, as she would step off the nest, go to the door, and try to get out. The arrangement was satisfactory and were it not for the lice, which were not easily gotten rid of, since the chicks grew with the mother hen, we would prefer it to some incubators we have used.

The advantages of a closed room in which to confine the sitters are many, as the hens are easily controlled and do not need watching as they do when selecting nests for themselves, or when sitting in the same room with laying hens. A room a dozen feet square could be arranged so as to easily accommodate fifty sitters. Except for the small operator we would not encourage the use of sitting hens.

For the accommodation of the hen with her brood of young chicks, the best arrangement consists of a close coop about 30 inches square, with a hinged roof, and a movable floor in two parts, which can be lifted out each day for cleaning. This little coop has a wire covered yard attached to it on the south side. The yard is 4 by 5 feet in size and a foot and a half high. Its frame is of 1x3 inch strips and is fastened securely to the coop.

The wire on the sides is of one inch mesh, but on top two inch mesh is sufficient. The coop is easily kept clean and the coop and yard can be set over onto clean grass by one person.

The small run is sufficient for the first few weeks, but soon the chicks need greater range and then the farther end of the run can be lifted up 3 or 4 inches and they can pass in and out at will, while the mother will be secure at home, and they will know where to find her when they get cold or damp, and need brooding. Such a coop accommodates 15 to 20 chicks until they no longer require brooding, after which several flocks are combined in one and put in a portable house on a grassy range.

Whenever the hen is allowed to hatch, or to mother chicks, much care must be experienced or lice will get a foothold and ruin the birds. The free and frequent use of fresh insect powder upon the hen, working it through the feathers to the skin, is one of the best methods for destroying the pests. Grease or oil are effective when applied to the heads and under the wings of young chicks, but care must be taken not to get too much on them, especially during damp weather. The feeding of chicks raised in coops with their mothers does not vary much from those raised in brooders.

RAISING CHICKENS BY ARTIFICIAL PROCESSES.

Incubators have been so much improved that there are several kinds on the market that we feel sure will hatch as many chicks from a given lot of eggs as can be done by selected broody hens. They require little care, maintain an even temperature, and are easily adjusted to meet the increase in temperature arising from developments going on in the eggs. In some machines the moisture supply is automatic and adapted to the requirements. In others it has to be supplied, and skill is necessary in determining the quantity needed. The economy of the incubator is very great. A 360 egg machine will do the work of nearly 30 broody hens, and can be kept at work continually, if desired. We commenced our work in artificial incubation years ago, by trying to maintain the temperature in a home-made wooden box, with double walls, by the use of jugs of warm water. By locating the box in a suitable room and keeping close watch on conditions, good



FIG. 2. BROODER HOUSES ON THE RANGE.

See page 6.

hatches were obtained. It was the best there was at that time, but the use of home-made incubators now, would be like turning back into the days of the wooden plow.

There are several kinds of good incubators, but the one which we have used with greatest satisfaction is the Cyphers, with its capacity of 360 eggs. We have used others that hatch as well, but the Cyphers requires less care. We have not tested many incubators and other makes that we have not used may be as good.

The incubator room must be kept quite constant in temperature. A cellar is a good place in which to run incubators if it is not so cold as to require the lamps to be run very high in order to maintain the necessary degree of warmth inside of the machine. If several incubators are located in the same room, great care should be taken to provide proper ventilation, so that the machines may be furnished with clean fresh air at all times.

Where many machines are used, the hand turning of the eggs absorbs considerable time. We have used several turning devices and conducted experiments to determine the differences between hand and machine turning, and have not yet received better hatches from the hand turned eggs. Machines that have automatic turning shelves will not hold quite as many eggs as when flat shelves are used, but the saving of time is of importance.

A person should get thoroughly acquainted with a machine before putting the eggs in and then make changes and adjustments with great care, lest the results be extreme. We used to think it necessary to have the chickens hatched in March so that they might be ready for laying by November. By better methods of feeding and treatment we can now delay the hatching until April, and the first half of May, and the pullets get to laying maturity as early in the season as formerly.

We use indoor brooders, mostly, and very much prefer them to any outside brooders we have seen in use. The portable brooder houses are built on runners so that they may be readily moved about. The houses are 12 feet long, some of them are 6 and others 7 feet wide. Seven feet is the better width. They are 6 feet high in front and 4 feet high at the back. The frame is of 2x3 inch stuff; the floor is double boarded. The building is

boarded, papered and shingled all over. A door, 2 feet wide is in the center of the front and a 6 light, sliding window is on each side of it. A small slide is put in the door, near the top, by which ventilation may be obtained early in the season, before the windows can be kept open. Since shingles on the walls near the bottom are liable to be torn off in moving the houses, double boarding on the walls would be preferable. Two brooders are placed in each of these houses and 50 to 60 chicks are put with each brooder. A low partition separates the flocks while they are young, but later it has to be made higher. The houses are large enough so that a person can go in and do the work comfortably and each one accommodates 100 chicks until the cockerels are large enough to be removed.

In the fall these houses are grouped together, 20 or 30 feet from each other, so as to make the care of the young chicks convenient in early spring while the brooders are in use.

About the 20th of June the grass is cut on some field near to the main poultry, or farm buildings, and the brooder houses are drawn out, with their contents of chickens, and located 50 to 75 feet from each other, in lines, so that they may be reached with little travel. The chickens are shut into small yards, adjoining the houses, for about a week, after which they are allowed to run together. They mostly keep to their own houses, although they wander away quite long distances during the day, returning at feed time, and at night.

The most satisfactory brooder that we have used is the "Peep O' Day." The style that we like best has the cover and part of one side arranged to turn down, making an inclining run the whole width of the brooder, up and down which the little chicks can go without crowding. Some of the later styles of brooders made by this company are not as satisfactory, as they have little passages, through which the chicks are to pass up and down, and they require more or less teaching before they will use them.

Most kinds of brooders as now made, keep the chicks comfortable, at desired temperatures, and have good means of ventilation. The great difficulty lies in the lamps used. The lamp apartments are small and the tendency is for the oil to become warm and form gases, which causes the flame to stream up and make trouble. Most brooder lamps have water pans between the oil tank and the burner which tend to keep the oil cool, but



Fig. 3. PIONEER OPEN FRONT HOUSE.
Described on page 12.



Fig. 4. BROODER HOUSE.
Described on page 5.

even with this precaution we have had two fires, one of which was very serious. The old Peep O' Day lamp was of this kind, but the new ones are entirely different and by far the best of any we have seen. They have no water pans, but are so arranged that currents of cool air pass constantly over the oil tank and keep its contents cool. We have used these lamps, or stoves, for three years—last year more than twenty of them—and regard them as safe, for the oil has never become warm.

TREATMENT OF YOUNG CHICKS.

When the chicks are 30 to 40 hours old they are carried in warm covered baskets to the brooders, and 50 or 60 are put under each hover, where the temperature is between 95 and 100 degrees. The temperature is not allowed to fall below 95 degrees the first week, or 90 during the second week; then it is gradually reduced according to the temperature outside, care being taken not to drive the chicks out by too much heat, or to cause them to crowd together under the hover because they are cold. They should flatten out separately, when young, and a little later, lie with their heads just at the edge of the fringe of the hover. Under no condition are they allowed to huddle outside of the brooder. They huddle because they are cold, and they should be put under the hover to get warm, until they learn to do so of their own accord. Neither are they allowed to stay under the hover too much, but are forced out into the cooler air where they gain strength in the day time. They are not allowed to get more than a foot from the hover during the first two days; then a little further away each day, and down onto the house floor about the fourth or fifth day, if the weather is not too cold. They must not get cold enough to huddle or cry, but they *must* come out from under the hover frequently.

The floor of the brooder is cleaned every day and kept well sprinkled with sharp, fine crushed rock, known in the market as "chicken grit." The floor of the house is covered with clover leaves, or hay chaff, from the feeding floor in the cattle barns. For raising winter chickens the long piped brooder house is indispensable, and it has many advantages when used at any season of the year. The advantages are especially great when raising chickens, if April or May prove to be cold and wet, for then the small houses are apt to be cold outside of the brooders.

The expenditure is greater for the piped house, for the reason that colony houses should be provided in which the chickens may be sheltered after they leave the brooder-house. In ordinary seasons we experience no difficulty in raising April and May hatched chicks in the small houses. With proper feeding, pullets hatched in these months are early enough to do good work throughout the year.

FEEDING THE CHICKS.

For feed for young chicks we make bread by mixing three parts corn meal, one part wheat bran, and one part wheat middlings or flour, with skim milk or water, mixing it very dry, and salting as usual for bread. It is baked thoroughly, and when well done if it is not dry enough so as to crumble, it is broken up and dried out in the oven and then ground in a mortar or mill. The infertile eggs are hard boiled and ground shell and all, in a sausage mill. About one part of ground egg and four parts of the bread crumbs are rubbed together until the egg is well divided. This bread makes up about one-half of the food of the chicks until they are five or six weeks old. Eggs are always used with it for the first one or two weeks, and then fine sifted beef scrap is mixed with the bread.

It may be that the bread is not necessary and that something else is just as good. We have tried many other foods, including several of the most highly advertised prepared dry chicken foods, but as yet have found nothing that gives us as good health and growth as the bread fed in connection with dry broken grains.

When the chicks are first brought to the brooders, bread crumbs are sprinkled on the floor of the brooder among the grit, and in this way they learn to eat, taking in grit and food at the same time. After the first day the food is given in tin plates, 4 to each brooder. The plates have low edges, and the chicks go onto them and find the food readily. After they have had the food before them for five minutes the plates are removed. As they have not spilled much of it, they have little left to lunch on except what they scratch for. In the course of a few days light wooden troughs are substituted for the plates. The bottom of the trough is a strip of half inch board, 2 feet long and 3 inches wide. Laths are nailed around the edges. The birds are

fed four times a day in these troughs until they outgrow them, as follows: Bread and egg or scrap early in the morning; at half past nine o'clock dry grain, either pin head oats, crushed wheat, millett seed or cracked corn. At one o'clock dry grain again, and the last feed of the day is of the bread with egg or scrap.

Between the four feeds in the pans or troughs, millett seed, pin head oats and fine cracked corn, and later whole wheat, are scattered in the chaff on the floor for the chicks to scratch for. This makes them exercise, and care is taken that they do not find the food too easily.

One condition is made imperative in our feeding. The food is never to remain in the troughs more than 5 minutes before the troughs are cleaned or removed. This insures sharp appetites at meal time, and guards against inactivity which comes from over feeding.

Charcoal, granulated bone, oyster shell and sharp grit are always kept by them, as well as clean water. Mangolds are cut into slices, which they soon learn to peck. When the grass begins to grow they are able to get green food from the yards. If the small yards are worn out before they are moved to the range, green cut clover or rape is fed to them.

After the chickens are moved to the range they are fed in the same manner, except that the morning and evening feed is made of corn meal, middlings and wheat bran, to which one tenth as much beef scrap is added. The other two feeds are of wheat and cracked corn. One year we fed double the amount of scrap all through the growing season and had the April and May pullets well developed and laying through September and October. To our sorrow they nearly all moulted in December, and that month and January were nearly bare of eggs.

FEEDING THE COCKERELS FOR MARKET.

When the chickens are moved to the field the sexes are separated. The pullets are cared for as explained above. The cockerels are confined in yards, in lots of about 100, and fed twice daily on porridge made of 4 parts corn meal, 2 parts middlings or flour, and one part fine beef scrap. The mixed meals are wet with skim milk or water—milk is preferred—until the mixture will just run, but not drop, from the end of a wooden

spoon. They are given what they will eat of this in the morning and again towards evening. It is left before them until all have eaten heartily, not more than an hour at one time, after which the troughs are removed and cleaned. The cockerels are given plenty of shade and kept as quiet as possible.

We have found our chickens that are about one hundred days old at the beginning to gain in four weeks' feeding, from one and three-fourths to two and one-fourth pounds each and sometimes more.* Confined and fed in this way they are meaty and soft and in very much better market condition than though they had been fed generously on dry grains and given more liberty. Poultry raisers cannot afford to sell the chickens as they run, but they can profit greatly by fleshing and fattening them as described. Many careful tests in chicken feeding have shown that as great gains are as cheaply and more easily made, when the chickens, in lots not to exceed 100, are put in a house with a floor space of 75 to 100 feet and a yard of corresponding size, as when they are divided into lots of 4 birds each and confined in latticed coops, just large enough to hold them. Four weeks has been about the limit of profitable feeding, both in the large and small lots. Chickens gain faster while young. In every case birds that were one hundred and fifty to one hundred and seventy-five days old have given us comparatively small gains. The practice of successful poultrymen in selling the cockerels at the earliest marketable age is well founded, for the spring chicken, sold at Thanksgiving time is an expensive product.

A very large proportion of the chickens raised in this State are sent to market alive, without being fattened, usually bringing to the growers from twenty-five to thirty-five cents each. The experiments referred to above indicate that they can be retained and fed a few weeks, in inexpensive sheds, or large coops with small runs, and sent to the markets dressed, and make good returns for the labor and care expended. The quality of the well-covered, soft fleshed chickens, if not too fat, is so much superior to the same birds not specially prepared, that they will be sought for at the higher price. The dairy farmer is particularly well prepared to carry on this work as he has the skim milk which is of great importance in obtaining yield and quality of flesh.

* See bulletins 64 and 79 of this station.

THE WARMED HOUSE FOR HENS.

This house, which was erected in 1898, is 16 feet wide and 150 feet long. It faces the south and conforms nearly to the land surface, the east end being $3\frac{1}{2}$ feet lower than the west end. The sills are of 4x6 inch hemlock, placed flat, upon a rough stone wall which rests upon the ground surface, and varies from one to two feet in height. The earth is graded up to within six inches of the sills on the outside. The floor timbers are 2x8 inches, placed $2\frac{1}{2}$ feet apart, and rest on the sills. The studs for the back wall are 2x4 stuff, 5 feet 8 inches long, and rest on the sills. The front studs are 10 feet 6 inches long. All the studs are set 3 feet apart. Each 10 feet in length of the front of the building has one 12 light window of 10x12 glass. The top of this window comes within one foot of the plate. Directly underneath these windows and 6 inches above the floor, are other 3 light windows of 10x12 glass. The building is boarded, papered and shingled all over the outside, roof and walls. The floor is of two thicknesses of hemlock boards. The entire inside of the building is papered on the studs and rafters and sheathed with matched boards. The work was carefully done and good dead air spaces were obtained over the whole building.

The building is divided into 15 ten foot sections. The close partitions between the pens are 2 feet high and are made of 2 inch plank. They form strong trusses, to which the studs supporting the central plate are strongly nailed. This saves the floor from sagging from the weight of the roof when it is covered with snow. An elevated plank walk, 4 feet wide, runs along the whole length of the front of the building and rests on the cross partitions just mentioned. The walk is $2\frac{1}{2}$ feet above the floor and allows the hens to occupy the whole floor space. This part of the floor is lighted from the front, by the small windows spoken of above. Above the close partition the pens are separated from each other and the walk by wire netting of 2 inch mesh. Light, wooden frame doors, covered with wire, and hung with double acting spring hinges, are in every cross partition, and also in the partition between the elevated walk and each pen.

The back ends of the cross partitions, 4 feet out from the back wall, are carried up to the roof, so as to protect the hens from

currents of air while on the roosts. The roost platform is along the back wall. Four trap nests described beyond, of our own devising and construction, are placed at the back of the house, at the end of the roost platform.

All the windows are double. Eight of the large outside ones are hinged at the top and kept hasped out one foot at the bottom, except in the roughest weather, and cold winter nights. This furnishes ventilation without drafts, as the position of the outside windows prevents strong currents of air from entering.

Although this house was thoroughly built, we found that the windows had to be closed during rough winter weather, or water would freeze quite hard inside the building. Closing the windows caused dampness and frost on the walls, and the straw litter absorbed the moisture and became, while yet clean, disagreeable to the hens. A hot water heater was placed in a pit at the lower end of the building, and one line of two inch pipe was carried under the roosts to the upper end of the building and returned to the boiler. By use of this heater the building is kept above the freezing point at all times, and there is not much trouble from moisture except when extremely cold weather necessitates the closing of the windows.

The birds in this house have always been in excellent health, and have never shrunk in their egg yields from cold weather except one season, when coal was not procurable and the temperature ran low.

The ease with which the hens are cared for, the availability of the entire floor space, and the welfare and productiveness of the birds kept here, commends this building as one of the best. It was planned and constructed so as to obtain conditions necessary for the welfare of the birds and economize the labor involved in their care at as small cost as was consistent with quality. Not a single part was made for show. While a single walled building would have cost less, it would not have kept the hens warm or given protection from dampness, that prevails in close single-walled houses.

THE PIONEER ROOSTING CLOSET HOUSE.

A dozen years ago several little houses, each 10 feet square, were built for colonies of hens. They were well built and warm, but were apt to be damp and lined with white frost in very cold

weather, when the windows had to be kept shut to save the birds from suffering at night. Another feature against them was their size. A person can not care for hens in so small a pen without keeping them in a condition of unrest, for they fear being cornered in so small a room. Three years ago one of these 10 feet square houses was taken for a nucleus and an addition made, so that the reconstructed house was 10 feet wide and 25 long. The end of the old house was taken out, so that there was one room with a floor space of 250 square feet. The walls were about $5\frac{1}{2}$ feet high in the clear, inside of the building. The whole of the front wall was not filled in, but a space 3 feet wide and 15 feet long was left just under the plate. This space had a frame, covered with white drilling, hinged at the top on the inside, so it could be let down and buttoned during driving storms and winter nights, but hung up out of the way at all other times. The roost platform extended the whole length of the back of the room. It was 3 feet 4 inches wide and 3 feet above the floor. The back wall and up the roof for 4 feet was lined and packed hard with fine hay. The packing also extended part way across the ends of the room.

Two roosts were used, but they did not take the whole length of the platform, a space of 4 feet at one end being reserved for a crate where broody hens could be confined, until the desire for sitting should be overcome. The space, from the front edge of the platform up to the roof, was covered by frame curtains of drilling, similar to the one on the front wall. The cloth curtains were oiled with hot linseed oil. They were hinged at the top edge and kept turned up out of the way during day time, but from the commencement of cold weather until spring they were closed down every night after the hens went to roost. The hens were shut in to this close roosting closet and kept there nights, and released as early in the morning as they could see to scratch for the grain which was sprinkled in the 8 inch deep straw on the floor.

The roosting closet was closely observed and has never been damp, or its odors offensive when opened in the mornings. There was very little freezing in the closets in the coldest weather. The birds seemed to enjoy coming out of the warm sleeping closet down into the cold straw, which was never damp, but always dry, because the whole house was open to the out-

side air and sun every day. There were no shut off corners of floor or closet that were damp. We used this building through three winters, with 50 hens in it, and have not had a case of sickness in it yet. Not a case of cold or snuffles has developed from sleeping in the closet with its cloth front, and then going directly down into the cold room and spending the day in the open air.

The birds have laid as well as their mates in the large warmed house have done; averaging last year above 150 eggs each. Their combs have been red and their plumage bright, and they have given every evidence of perfect health and vigor. While they are on the roosts, in bed, they are warm. They come down to their breakfasts and spend the day in the open air. Such treatment gives vigor and snap to the human, and it seems to work equally well with the hen.

The results of the three years use of this house have been such that we feel very sure that this is one of the right systems of treatment and housing of hens, and it was decided to build several houses on the same plan and join them together under one roof, as one house.

THE CURTAIN FRONT HOUSE FOR HENS.

This building was erected in 1903 and is 14 feet wide and 150 feet long. The back wall is $5\frac{1}{2}$ feet high from floor to top of plate inside, and the front wall is $6\frac{2}{3}$ feet high. The roof is of unequal span, the ridge being 4 feet in from the front wall. The height of the ridge above the floor is 9 feet. The sills are 4x6 inches in size and rest on a rough stone wall laid on the surface of the ground. A central sill gives support to the floor which at times is quite heavily loaded with sand. The floor timbers are 2x8 inches in size and are placed 2 feet apart. The floor is two thicknesses of hemlock boards. All of the rest of the frame is of 2x4 inch stuff. The building is boarded, papered and shingled, on roof and walls. The rear wall and 4 feet of the lower part of the rear roof, are ceiled on the inside of the studding and plates, and packed, very hard, with dry sawdust. In order to make the sawdust packing continuous between the wall and roof, the wall ceiling is carried up to within 6 inches of the plate, then follows up inclining pieces of studding to the rafters.

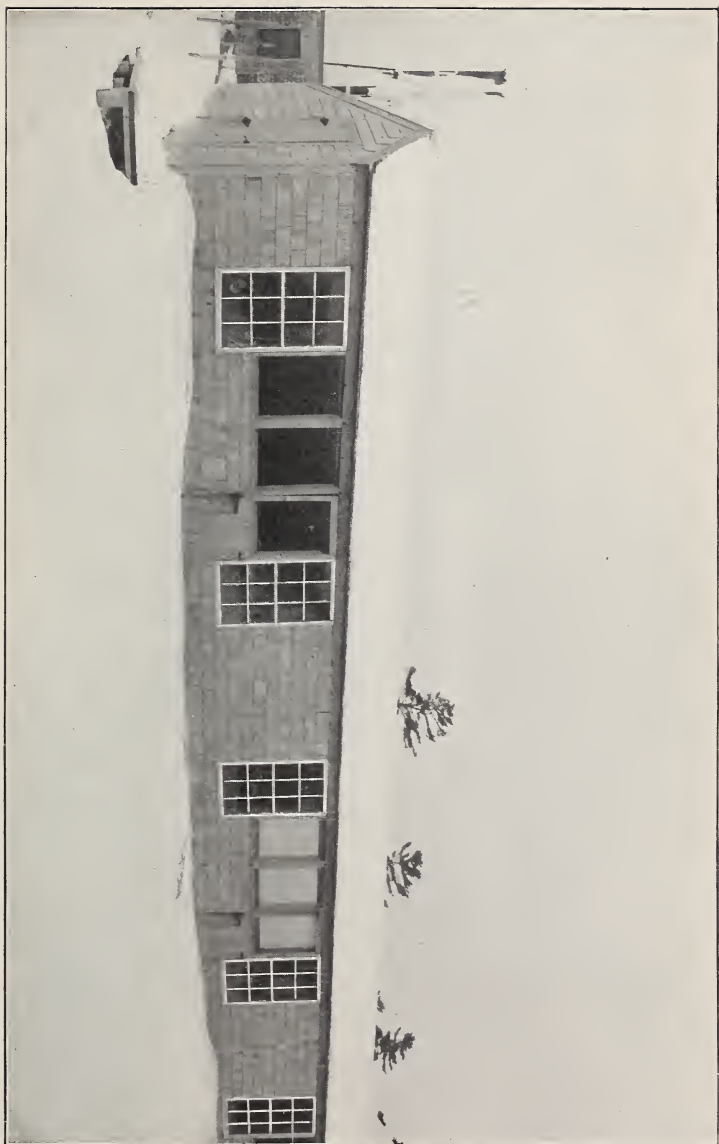


FIG. 5. TWO SECTIONS OF CURTAIN FRONT HOUSE.
Described on page 14.

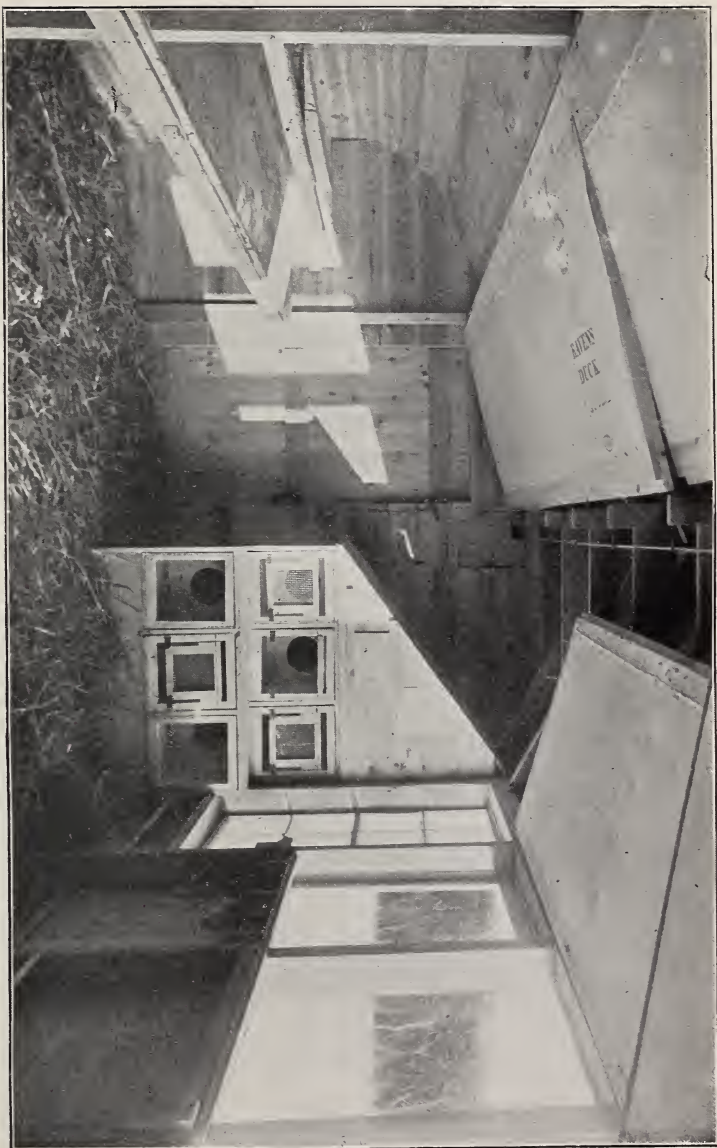


FIG. 6. INTERIOR OF ONE SECTION OF CURTAIN FRONT HOUSE.
Described on page 11.

The short pieces of studding are nailed to the studs and rafters. By this arrangement there are no slack places around the plate to admit cold air. The end walls are packed in the same way. The house is divided by close board partitions into seven 20 foot sections; and one 10 foot section is reserved at the lower end for a feed storage room.

Each of the 20 foot sections has two 12 light, outside windows screwed onto the front, and the space between the windows, which is 8 feet long, and 3 feet wide, down from the plate, is covered during rough winter storms and cold nights, by a light frame, covered with 10 ounce duck, closely tacked on. This door, or curtain is hinged at the top and swings in and up to the roof when open.

A door $2\frac{1}{2}$ feet wide is in the front of each section. The roost platform is at the back side of each room and extends the whole 20 feet. The platform is 3 feet 6 inches wide and is 3 feet above the floor. The roosts are of 2×3 inch stuff placed on edge and are 10 inches above the platform. The back one is 11 inches out from the wall and the space between the two is 16 inches, leaving 15 inches between the front roost and the duck curtain, which is sufficient to prevent the curtain being soiled by the birds on the roost. The two curtains in front of the roost are similar to the one in the front of the house. They are each 10 feet long and 30 inches wide, hinged at the top, and open out into the room and fasten up when not in use. Great care was exercised in constructing the roosting closets, to have them as near air tight as possible, excepting what may be admitted through the cloth curtain.

Single pulleys are hung at the rafters, and with half inch rope fastened to the lower edge of the curtain frames they are easily raised or lowered and kept in place. At one end of the roosts, a space of 3 feet is reserved for a cage for broody hens. This being behind the curtain, the birds have the same night temperature when they are transferred from the roosts to the cage.

Six trap nests are placed at one end of each room, and four at the other. They are put near the front so that the light may be good for reading and recording the number on the leg bands of the birds. Several shelves are put on the walls, $1\frac{1}{2}$ feet above the floor, for shell, grit, bone, etc. The doors which admit from one room to another, throughout the building, are frames

covered with 10 ounce duck, so as to make them light. They are hung with double acting spring hinges. The advantages of having all doors push from a person are very great, as they hinder the passage of the attendant, with his baskets and pails, very little. Strips of old rubber belting are nailed around the studs which the doors rub against as they swing to, so as to just catch and hold them from opening too easily by the wind. Tight board partitions were used between the pens instead of wire, so as to prevent drafts. A platform 3 feet wide, extends across both ends and the entire front of the building, outside.

The house is well made of good material and should prove to be durable. It costs about \$850. A rougher building with plain instead of trap nests, with the roof and walls covered with some of the prepared materials, instead of shingles, could be built for less money, and would probably furnish as comfortable quarters for the birds for a time, as this building will.

This house accommodates 350 hens—50 in each 20 foot section. It was not ready for occupancy until the 6th of December. Since then there has been some very severe weather, considerably below zero at night and about zero during the day, with a good deal of high wind. During this rough weather the bedding on the floor has kept comparatively dry; and the voidings on the platform, as found when the curtains were raised in the mornings, have been but slightly frozen. The yields of eggs during this severe weather and the week immediately following it, were not below those immediately preceding it. It should be borne in mind that had the weather been mild during that time the hens probably would have increased in production rather than remain stationary. They were doubtless affected by the severe weather, but not seriously, as they began to increase in production very soon after the weather became usual for midwinter.

THE YARDS.

The yards to most poultry houses are at the south, or sheltered sides of the buildings, to afford protection during late fall and early spring, when cold winds are common. The north house has yards on both north and south sides with convenient gates. The south yards are used until the cold winds are over in spring, when they will go to the north yards, which are well set in grass sod. With the new curtain front south house the yards are to be

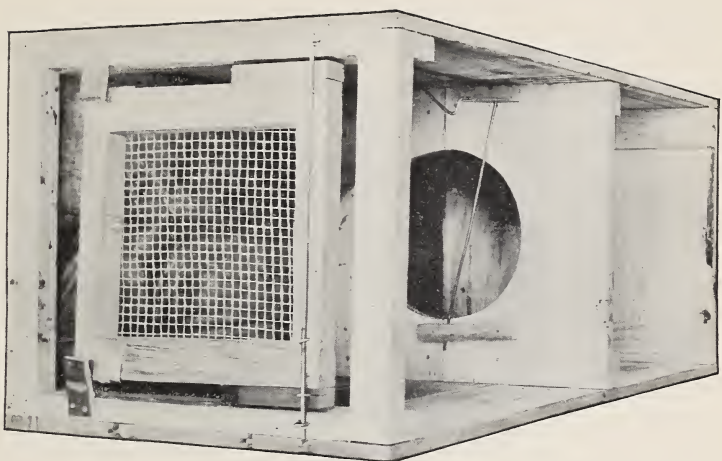


Fig. 7. Front and Top View.

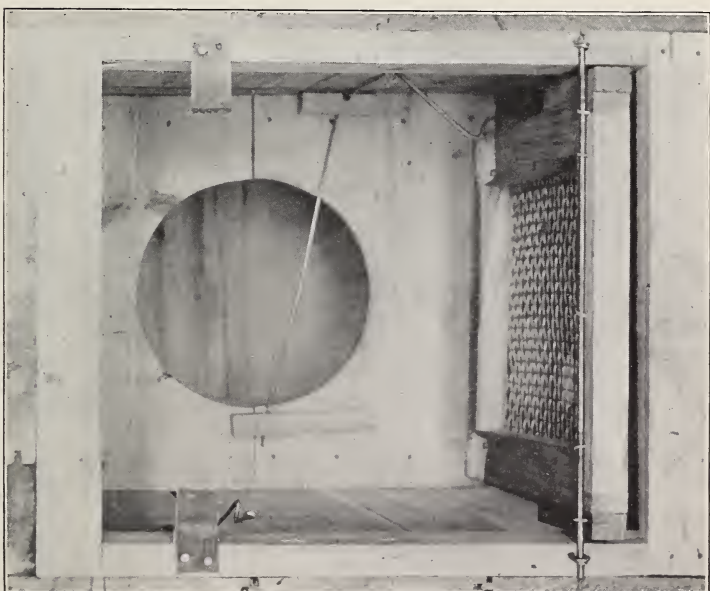


Fig. 8. Front View.

on the north side only. The birds will be kept in the building until the weather is suitable for opening the small doors in the rear wall. The necessity for getting them out from the open front house, where they are really subject to most of the out of door conditions during the day time, is not so great as when they are confined in close houses, with walls and glass windows. The use of the rear yards only, may not prove satisfactory. If however, as good yields of eggs and health of birds result, many decided advantages will be obtained by dispensing with front yards. The clear open front of the house allows teams to pass close to the open door of the pens for cleaning out worn material, and delivering new bedding, and also in allowing attendants to enter and leave all pens from the outside walk, and reach the feed room without passing through intervening pens.

TRAP NESTS.

The nest which we use is original with us. It is very simple, inexpensive, easy to attend and certain in its action. It is a box-like structure without front end or cover, 28 inches long, 13 inches wide and 16 inches deep, inside measure. A division board with a circular opening $7\frac{1}{2}$ inches in diameter is placed across the box, 12 inches from the rear end and 15 inches from the front end. The rear section is the nest proper. Instead of a close made door at the entrance, a light frame of 1 by $1\frac{1}{2}$ inch stuff is covered with wire netting of one inch mesh. The door is 10 inches wide by 10 inches high, and does not fill the entire entrance, a space of two inches being left at the bottom, and one inch at the top, with a good margin at each side, to avoid friction. It is hinged at the top and opens up into the box. The hinges are placed on the front of the door rather than at the center or rear, the better to secure complete closing action. The trap consists of one piece of stiff wire about three-sixteenths of an inch in diameter and 22 inches long. This piece of wire is shaped so that a section of it, 11 inches long, rests directly across the circular opening in the division board and is held in place by two clamps, one on either side of the circular opening. The clamps fit loosely and the slots are long enough to allow the wire to work up and down about three inches, without much friction. The next section of the wire is eight inches long and it is bent

so that it is at right angles with the eleven inch section. It passes along the side of the box eleven inches above the floor, back toward the entrance door and is fastened strongly to the wall by staples, but yet loosely enough so that the wire can roll easily. The remaining section of the wire, which is three inches long, is bent toward the center of the box, with an upward inclination, so that it supports the door when it is open and rests upon it. The end of the wire is turned over smoothly, forming a notch into which the door may slip when opened.

As the hen passes in under the open door and then through the circular opening to the nest, she raises herself so that her keel may pass over the lower part of the division board, and her back presses against the horizontal wire, as she passes it, and lifts it enough, so that the end supporting the door slides from under it, and the door swings down and passes a wire spring, near the bottom of the box, at the entrance, which locks it and prevents the hen from escaping, and others from entering.

The double box with nest in rear is necessary, as when a hen has laid and desires to leave the nest, she steps out into the front space and remains there, generally trying to escape, until she is released. With one section only she would be very likely to crush her egg by stepping upon it and learn the pernicious habit of egg-eating.

The boxes are placed four in a block, and slide in and out like drawers and can be carried away for cleansing when necessary. Four nests in a pen have accommodated 20 hens, by the attendant going through the pens once an hour, or a little oftener, during that part of the day when the hens are busiest. Earlier and later in the day his visits have not been so frequent. To remove a hen, the nest is pulled part way out and as it has no cover, she is readily lifted up, and the number on her leg band is noted on the record sheet, that is tacked up, close at hand. After having been taken off a few times they do not object to being handled, the most of them remaining quiet, apparently expecting to be picked up.

Before commencing the use of trap nests, it was thought that some hens might be irritated by the trapping operation and object to the noise incident to it, but we have not found an individual that appeared to be annoyed by it, and we have used Leghorns, Brahmas, Wyandottes and Plymouth Rocks. The

amount of time required in caring for the trap nests, so far as our work goes, can only be estimated, as the time varies from one day to another, and having only fifty-two nests in operation, the attendant's time was divided with other duties. By noting the total time used per day in caring for the nests, when the hens were laying most heavily, it is believed that one active person devoting his entire time to trap nests, like ours, would take care of 400 to 500 nests used by 2,000 to 2,500 hens. When commencing the year's work he would need assistance in banding the birds, but after that was done he could care for the nests without assistance until midsummer, when the egg yields would probably be diminished and a part of his time could be spared for other duties.

One of the first difficulties encountered was with the leg bands. We procured and used all of the bands that appeared to be durable, and not likely to be lost off. Several kinds were easily put on but would last only a few weeks or months before they would be loosening or breaking, and we finally adopted a make, that consists of a fairly broad metallic band encircling the leg, with the ends held together by small brass spring rings. These rings would sometimes get broken or lost out and we put in two instead of one. Even then, when hens were moulting, broody, or for other reasons not frequently handled and the rings examined, the bands would sometimes get off. Bands with duplicate numbers and double rings are now used on both legs and the likelihood of losing the identity of a bird is small.

When not using trap nests, the following is a very satisfactory nest. It is a foot wide, a foot high and three feet long with cover. A partition in the middle has an opening just large enough to admit the passage of a hen. The nest openings are away from the light and when a hen goes to the nest and looks in she blocks the opening and shuts out the light and does not see the eggs plainly. The temptation to meddle and break them is thus removed.

FEEDING THE HENS.

For twenty-one years we have been at work with the same family of Barred Plymouth Rocks and have learned one way to feed and handle them to secure eggs, and to avoid the losses which are so common to mature hens of that breed, from over

fatness. Other methods of feeding may be as good or even better. While it is true that only the full fed hen can lay to the limit of her capacity it is equally true that full feeding of the Plymouth Rocks, unless correctly done, results disastrously.

Years ago the "morning mash," which was regarded as necessary to "warm up the cold hen," so she could lay that day, was given up and it was fed at night. The birds are fed throughout the year daily as follows: Each pen of twenty-two receives one pint of wheat in the deep litter early in the morning. At 9.30 A. M. one-half pint of oats is fed to them in the same way. At 1 P. M. one-half pint of cracked corn is given in the litter as before. At 3 P. M. in winter and 4 P. M. in summer they are given all the mash they will eat up clean in half an hour. The mash is made of the following mixture of meals: 200 lbs. wheat bran; 100 lbs. corn meal; 100 lbs. wheat middling; 100 lbs. linseed meal; 100 lbs. gluten meal; 100 lbs. beef scrap. The mash contains one-fourth of its bulk of clover leaves and heads, obtained from the feeding floor in the cattle barn. The clover is covered with hot water and allowed to stand for three or four hours. The mash is made quite dry, and rubbed down with the shovel in mixing, so that the pieces of clover are separated and covered with the meal. Cracked bone, oyster shell, clean grit, and water are before them all of the time. Two large mangolds are fed to the birds in each pen daily in winter. They are struck on to large nails which are partly driven into the wall, a foot and a half above the floor. Very few soft shelled eggs are laid and, so far as known, not an egg has been eaten by the hens during the last five years.

We are testing another method of feeding with several pens of hens this year. It consists of the morning, 9.30 A. M., and 1 P. M. feedings of dry food in the litter as usual, but instead of the mash at 3 P. M. all the dry cracked corn they will eat is given in troughs. Beef scrap is kept before the birds at all times, in elevated troughs where they cannot waste it. They are supplied with grit, oyster shell, bone, and mangolds. Dry clover leaves and chaff are given them on the floor each day. One pen of 30 hens were fed through last year in this way with good results, and 150 hens are being fed on the dry food, through this year, in comparison with a like number of their mates that are having mash at the 3 P. M. feeding, as usual with us.

